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THE FIRST CZECHOSLOVAK ELECTRONICS CONFERENCE

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THE FIRST CZECHOSLOVAK ELECTRONICS CONFERENCE

[Following is a translation of an article by L. Eckertova in Slaboproudy Obzor (The Weak Current Review) Vol. 21, No 6, Prague, 10 June 1960, pages 382-383.]

The first nationwide electronics conference dedicated to the 15th anniversary of the liberation of CSR (Ceskoslovenska Republika - Czechoslovak Republic) took place in Prague between the 25th-27th April 1960. It was organized by the Union of Czechoslovak Mathematicians and Physicists, the Mathematical-Physics Faculty of Charles University and the Research Institute of Electrotechnology.

The opening session was addressed by the Minister of Education and Culture Dr. F. Kahuda who emphasized the importance of electronics within the broadest branches of national economy, praised highly the role of basic research and the necessity for close cooperation of the research establishments in institutes and universities with the development and production components. Dr. of Eng. J. Vana the director of Institute of Vacuum of Electronics of CSAV (Ceskoslovenska Akademie Ved - Czechoslovak Academy of Science) evaluated in his speech the current development of Czechoslovak electronics and its results during the past 15 years. Eng. Tohanka from the State Council for the development of technology described the perspective development of electronics in the future especially in its utilization to the national economy.

The plenary meeting heard also two composite reports from specified fields of basic importance which were of interest to a broad circle of specialists. These were the reports of L. Pekarek the director of the Physics Institute of CSAV dealing with the ionization phenomena in gases and the report of L. Paty from the Chair of Electronics and Vacuum Physics of the Mathematical Physics Faculty of Charles University dealing with the contemporary state of low pressure physics. The first of these reports was concerned primarily with the problems of plasma physics which have recently

come into the forfront in connection with the possibility of the realization of directed thermonuclear reaction. The speaker pointed out that the difficulties which appeared in the realization of this process emanate primarily from the fact that the questions of the basic physical characteristics of the plasma have as yet not been solved and that further study must be directed in this respect. The report dealing with the low pressure physics emphasized that this specialty has been formed only recently. Its development is connected with the perfecting of experimental techniques and with the continuously growing demands of various specialties of natural and technical sciences for the use of vacuum in experimental apparatus and production equipment. The report gave special attention to ultra-high vacuum systems (methods of obtaining and retaining extremely low pressures and the phenomena of sorption and decorption).

The main work of the conference was presented in various sections. The first section was concerned with the problem of generation and amplification of high frequency energy in the field of decimeter, centimeter and millimeter waves. Reports were made concerning research and development of several specialized electron producers modified for these purposes (magnetophones, carcinitrons, reflects clystrons, permactroms and coaxial electron producers) and it was stated that world level paramiters have been achieved in relatively broad assortment of these electron sources. The possibility of utilization of a coherent release of electrons in a circular accelerator for the generation of millimeter waves.

The second section was dedicated to the study of explosions in gases and to the physics of plasma. It dealt with the questions of low pressure explosion, the interaction of high frequency field with plasma and the utilization of this interaction for the determination of the parameters of the plasma as well as with questions of concentration and temperature of particles in high pressure plasma and questions of electro-conductive spaces.

The third section (section of cathode electronics) dealt with the problems of thermo-emission, photoelectric phenomena and secondary emission of electrons especially in the application to electron multipliers. The works dealing with thermo-emission were technological in character. In the second group of problems attention was given primarily to the fatigue of effective photo-cathodes and to the characteristics of a multi-alkaline cathode. Secondary emission was studied under a dynamic regime and reports were presented about several Czechoslovak multipliers and about the emission characteristics of oxidized alloys whose active component was beryllium. Attention was also given to a direct transformation of thermal energy into

electrical energy with the aid of thermoenission and to the auto-emission of thin dielectric layers. A deficiency of theoretical reports was characteristic for the situation existing in cathode electronics and basic research was not supported very strongly. Because of this it was proposed to increase basic research within the framework of VUVET (Vyzkumny Ustav pro Vakuovou Elektrotechniku-Research Institute for Vacuum Electrotechnology) and to produce better equipment for the laboratories of the university Chairs of Electronics and Physics.

In the section on vacuum physics, technique and technology the reports were directed on one side toward physical questions e.g. the mechanism of the pumping process indiffusion and ion centrifuges and the questions of the methodology of measuring low pressures and on the other side toward questions of more technical nature e.g. the search for leaks, methods of vacuum tight connecting of various materials etc.. Emphasis was placed on the problems in the production of ultrahigh vacuum and on the problems of surface processes in vacuum systems. Many workers of this section pointed out that the swiftest of vacuum physics and technology is being hindered by the fact that in CSR there does not exist a unified production basis for vacuum equipment and standardized parts for vacuum apparatus. It was proposed that a research laboratory be established at the Chair of Electronics and Vacuum Physics of Charles University in order to strengthen basic research in the field of extremely low pressures.

The problems of the section of electron and ion optics were roughly divided into three groups. These were questions connected with circular electron accelerators, questions dealing with electronic bonds (measurement of the division of stream density, characteristic of turbulent bonds) and questions dealing with material spectrometers. It was stated that the standard of individual works was good but that they are dealing with narrowly specialized branches of electronics and ion optics. This is the result of the fact that electron optics have not been so far studied systematically as an individual scientific specialty and that their problems have been directed primarily according to the needs of other branches of electronics. It was therefor proposed that a scientific research center be developed within the framework of one of the existing laboratories (e.g. VIVET, the laboratory of electron optics of CSAV and the Chair of Electronics of Charles University) which would be systematically concerned with basic research in this field.

The section of electronic circuits, the subjects discussed varied in the scope of their specialties. Reports dealt with the theory of non-linear circuits, circuits for centimeter waves, high frequency portions of the television channels etc.. In spite of their variety the reports did not by far cover all the problems of this field. It was pointed out that it is necessary to pay greater attention to the stability of the productionally guaranteed standard measurement instruments and to improve basically the quality and expand the assortment of radiotechnical parts.

A substantial part of the reports was published in the 5th number of this year's Czech edition of the Czechoslovak Journal of Physics.

At the conclusion of the conference a resolution was accepted which had been formulated on the basis of the discussion within the various sections and in the plenary meetings and on the basis of material presented in the program of the conference. The resolution contains an evaluation of the results of the conference from the specialized point of view and recommends the execution of several measures important for the further successful development of electronics in CSR. Such is the emphasized necessity to insure organizationally and materially the priority development of basic research in electronics so that it would maintain permanently its necessary lead over development and production. Several possible ways of achieving this goal by better utilization of the capacity of existing laboratories were suggested.

The necessity for the insurance of the education and training of a sufficient number of physicists specialized in electronics and for their planned allocation to research and developmental laboratories was also pointed out. Similar emphasis was placed on the supplementary training of graduate workers through post-graduate courses and seminars and on the necessity for the improvement of the training of engineers in the fundamentals of electronic physics and on the establishment of the specialized fields in the vicinity of the centers of the electro-vacuum industry.

It was recommended that the present day diffused production of several electronic and especially vacuum equipments be unified and that the speedy development and expansion of the production of standardized high vacuum and perspectively also ultra-high vacuum equipment be insured.

The resolution also contains other recommendations concerning the improvement in the production of parts, improvement in documentation, expansion of contacts with foreign workers etc.. Among others

it was recommended that a national committee for vacuum technology be established and that it become a member of the international organization OISTV (Organization Internationale pour la Science et la Technique du Vide).

It was determined that electronic conferences will take place regularly once every two years and that international participation will be promoted whenever possible.

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